Curriculum Vitae

Name: Eira Tuulia Seppälä

Contact address: Lawrence Livermore National Laboratory
7000 East Avenue, L-415
Livermore, CA 94550, USA
Phone: +1 (925) 422-8179, Fax: +1 (925) 422-6594
E-mail: Eira.Seppala@llnl.gov

Work experience:

8/2001 - , Lawrence Livermore National Laboratory, CA.

Post-doc staff researcher.

Dynamic fracture in metals. Atomistic molecular dynamics simulations of plasticity, specifically dislocations and void growth, in metals under strain. Development of molecular dynamics method, especially parallelization.

6/1994 - 8/2001, Laboratory of Physics, Helsinki University of Technology, Finland.

Researcher (6/2001 - 8/2001), PhD student (2/1997 - 6/2001), teaching assistant (9/1994 - 5/2000), undergraduate research student (6/1994 - 2/1997).

Statistical physics: Studies of ground states, phase transitions, interfaces, and wetting phenomena in random Ising magnets; fracture and percolation in random systems. Simulations of physical properties of paper. Graph-theoretical optimization algorithms applied to disordered systems. Parallelization of the optimization algorithms.

Teaching assistant in physics courses on 13 semester (6 different courses). Assistance in preparing lecture material. Supervised five summer students.

6/1993 - 7/1993, Institute of Industrial Automation, Helsinki University of Technology.

Undergraduate research student.

Programming in Windows-environment: created a link from a Toolbook/Openscript -program to a SQL-database.

Degrees:

6/2001	Doctor of Science (Engineering) in physics, minoring in mechanics, Helsinki University of Technology (thesis accepted with distinction).
2/1997	Master of Science (Engineering) in physics, minoring in mathematics, Helsinki University of Technology (thesis grade: 5/5).

Languages: Finnish (mother tongue), English (excellent), Swedish (good) and German.

Technical skills:

Computer experience on several UNIX/Linux-platforms including massively parallel computers (Cray T3D/E, SGI Origin 2000, alpha-stations).
Tens of thousands of lines of scientific programming in Fortran and C, parallel programming with MPI and High Performance Fortran.
Matlab, Mathematica, LaTeX, HTML, Xmgr, sh-script, emacs, etc.
Programming in Windows-environment, SQL.

References:

Dr. Mikko Alava, Helsinki University of Technology,
Phone: +358-9-451 3104, E-mail: Mikko.Alava@hut.fi

Prof. Phillip Duxbury, Michigan State University,
Phone: +1 (517) 353-9179, E-mail: duxbury@pa.msu.edu

Prof. Risto Nieminen, Helsinki University of Technology,
Phone: +358-9-451 3105, E-mail: Risto.Nieminen@hut.fi

Dr. Robert Rudd, Lawrence Livermore National Laboratory,
Phone: +1 (925) 422-4292, E-mail: Robert.Rudd@llnl.gov

Dr. James Belak, Lawrence Livermore National Laboratory,
Phone: +1 (925) 422-6061, E-mail: belak@llnl.gov

Grants, awards:

The Best Dissertation of the year 2001 of the Department of Engineering Physics and Mathematics, Helsinki University of Technology, 4000 Fmk.

Vilho, Yrjö, and Kalle Väisälä Foundation, grant for post doc research, €10 000, 2001.

The Finnish Cultural Foundation, grant for a conference trip, 25 000 Fmk, 2001.

Vilho, Yrjö, and Kalle Väisälä Foundation, grant for post doc research, 60 000 Fmk, 2000.

The Best Poster of Session 1S-Statistical Mechanics of Magnetism in the International Conference on Magnetism, ICM 2000, August 6-11th 2000, Recife, Brazil.

Alfred Kordelin Foundation, grant for a conference trip, 15 000 Fmk, 1998.

Vilho, Yrjö, and Kalle Väisälä Foundation, grant for a conference trip, 13 000 Fmk, 1997.

EU funded TMR/TRACS-programme in Edinburgh Parallel Computing Centre for three months in 1996 and for two months in 1997 at the Edinburgh University, UK.

Referee:

Physical Review Letters, Physical Review B, Physical Review E, Computational Materials Science.

Memberships:

American Physical Society, Finnish Physical Society, Materials Research Society.

Publications in refereed journals:

1. K. P. J. Kytölä, E. T. Seppälä, and M. J. Alava, "Elastic manifolds in disordered environments: energy statistics", submitted for publication in Europhysics Letters.
2. E. T. Seppälä, A. M. Pulkkinen, and M. J. Alava, "Percolation in Three-dimensional Random Field Ising Magnets", Physical Review B **66**, 144403 (2002).
3. E. T. Seppälä and M. J. Alava, "Energy landscapes, lowest gaps, and susceptibility of elastic manifolds at zero temperature", European Physical Journal B **21**, 407 (2001).
4. E. T. Seppälä, M. J. Alava, and P. M. Duxbury, "Extremal statistics in the energetics of domain walls", Physical Review E **63**, 066110 (2001).
5. E. T. Seppälä and M. J. Alava, "Susceptibility and Percolation in 2d Random Field Ising Magnets", Physical Review E **63**, 066109 (2001).
6. E. T. Seppälä, M. J. Alava, and P. M. Duxbury, "Intermittence and roughening of periodic elastic media", Physical Review E **63**, 036126 (2001).

7. J. Rosti, L. I. Salminen, E. T. Seppälä, M. J. Alava, and K. J. Niskanen, "Pinning of Cracks in Two-dimensional Disordered Media", European Physical Journal B **19**, 259 (2001).

8. E. T. Seppälä, M. J. Alava, and P. M. Duxbury, "Periodic elastic medium in which periodicity is relevant", Physical Review E **62**, 3230 (2000).

9. E. T. Seppälä and M. J. Alava, "Energy Landscapes in Random Systems, Driven Interfaces and Wetting", Physical Review Letters **84**, 3982 (2000).

10. Eira T. Seppälä, Vilho I. Räisänen, and Mikko J. Alava, "Scaling of Interfaces in Brittle Fracture and Perfect Plasticity", Physical Review E **61**, 6312 (2000).

11. K. J. Niskanen, M. J. Alava, E. T. Seppälä, and J. Åström, "Fracture Energy in Fiber and Bond Failure", Journal of Pulp and Paper Science **25**, 167 (1999).

12. E. T. Seppälä, V. Petäjä, and M. J. Alava, "Disorder, Order, and Domain Wall Roughening in the 2d Random Field Ising Model", Physical Review E **58**, R5217 (1998).

13. V. I. Räisänen, E. T. Seppälä, M. J. Alava, and P. M. Duxbury, "Quasi-Static Cracks and Minimal Energy Surfaces", Physical Review Letters **80**, 329 (1998).

14. N. Provatas, M. Haataja, E. Seppälä, S. Majaniemi, J. Åström, M. Alava, and T. Ala-Nissilä, "Growth, Percolation and Correlations in Disordered Fibre Networks", Journal of Statistical Physics **87**, 385 (1997).

Conference proceedings and other publications:

E. T. Seppälä, J. Belak, and R. E. Rudd, "A Molecular Dynamics Study of the Effect of Triaxiality on Void Growth in Dynamic Fracture", Advances in Computational Engineering & Sciences (2002), in press.

N. Provatas, M. Haataja, E. Seppälä, S. Majaniemi, M. Alava, and T. Ala-Nissilä, "Structural Properties of Disordered Fibre Networks", Physica A **239**, 304 (1997).

E. Seppälä, M. Alava, and K. Niskanen, "Paperin pinnan karheudesta" ("Can the Effect of Furnish be Detected in the Roughness of Handsheets"), Paperi ja Puu (Paper and Timber) **78**, 446 (1996).

E. T. Seppälä, J. Belak, and R. E. Rudd, "Effect of stress-triaxiality on void growth in dynamic fracture of metals: a molecular dynamics study", in preparation for Physical Review B.

Theses:

Ph.D. Thesis (accepted with distinction), *Ground State Structure, Domain Walls, and External Field Response in Random Magnets*, (Helsinki University of Technology, 2001, ISBN 951-22-5458-1).

Master's Thesis (grade: 5/5), *Scaling of Minimum Energy Interfaces*, (Helsinki University of Technology, 1996).

Invited talks in conferences:

"Three-Dimensional Random Field Ising Magnets: Percolation and Domain Walls" in the ESF/Sphinx Workshop "Disordered systems at low temperatures and their topological properties", January 17-20th 2002, Helsinki, Finland.

"Interfaces in Random Field Ising Systems" in the March Meeting 2001 of the American Physical Society, March 12-16th 2001, Seattle, Washington, USA.

"Serial and Parallel Maximum Flow-Minimum Cut Algorithms Applied to Random Bond and Random Field Ising systems", Dagstuhl Seminar #01091, Algorithmic Techniques in Physics, February 25th - March 2nd 2001, Schloss Dagstuhl, Germany.

Seminar talks at institutions:

"Molecular Dynamics Simulations of Void Growth in Dynamic Fracture of Metals: Effect of Triaxiality" at Department of Mechanical Engineering, Massachusetts Institute of Technology, USA, October 7th 2002.

"Percolation and Domain Walls in Random Field Ising Magnets" at Physics Department, University of California, Davis, USA, April 11th 2002.

"Dynamic Fracture in Metals: Plasticity at the Atomistic Scale" at Laboratory of Physics, Helsinki University of Technology, Finland, January 14th 2002.

"Ground State Structure and Domain Walls in Random Field Magnets" at Physics Department, University of California, Santa Cruz, USA, March 30th 2001.

"Ground State Structure and Domain Walls in Random Field Magnets" at Lawrence Livermore National Laboratory, USA, March 23rd 2001.

"Ground State Interfaces in Random Systems" at Department of Physics and Astronomy, Michigan State University, USA, September 2nd 1999.

"Minimum Energy Surfaces in Parallel" at Edinburgh Parallel Computing Centre, Edinburgh University, UK, March 30th 1996.

Contributed talks in conferences:

"A Molecular Dynamics Study of the Effect of Triaxiality on Void Growth in Dynamic Fracture" in the International Conference on Computational Engineering & Sciences, ICES '02, July 31^{st} - August 2^{nd} 2002, Reno, Nevada, USA.

"Universality in Ground State Energy Distributions of Random Elastic Manifolds" in the March Meeting 2002 of the American Physical Society, March 11-15^{th} 2002, Indianapolis, Indiana, USA.

"Dynamic Fracture in Metals: Effect of Triaxiality on Plasticity" in the March Meeting 2002 of the American Physical Society, March 11-15^{th} 2002, Indianapolis, Indiana, USA.

"Domain Walls in Random Magnets: Wetting and External Field Response" in the 21st IUPAP International Conference on Statistical Physics, STATPHYS21, July 15^{th}-21^{st} 2001, Cancún, México.

"Extended Criticality in the 2d Random Field Ising Magnets" in the International Conference on Magnetism, ICM 2000, August 6-11^{th} 2000, Recife, Brazil.

"Susceptibility of the 2d Random Field Ising Model" in the Ising Centennial Colloquium, a Satellite Meeting to ICM 2000, August 1^{st}-4^{th} 2000, Belo Horizonte, Brazil.

"Extended Criticality in the 2d Random Field Ising Model" in the March Meeting 2000 of the American Physical Society, March 20-24^{th} 2000, Minneapolis, Minnesota, USA.

"Extended Criticality in the 2d Random Field Ising Model" in the 34^{th} Annual Conference of the Finnish Physical Society, March 9-11^{th} 2000, Espoo, Finland.

"Behavior of an Interface in a Field" in the Centennial Meeting of the American Physical Society, March 20-26^{th} 1999, Atlanta, Georgia, USA.

"Behavior of an Interface in a Field" in the 33^{rd} Annual Conference of the Finnish Physical Society, March 4-6^{th} 1999, Turku, Finland.

"Order, Disorder, and Roughening in the 2d RFIM" in the Workshop on Classical and Quantum Aspects of Disorder, August 7-8^{th} 1998, Jyväskylä, Finland.

"First Order Transitions in Wetting and Glassy Energy Landscapes" in the 12^{th} Nordic Symposium on Computer Simulation, June 10-14^{th} 1998, Jyväskylä, Finland.

Poster presentations:

"Susceptibility of Domain Walls in Random Magnets" in the International Conference on Magnetism, ICM 2000, August 6-11th 2000, Recife, Brazil.

"Energy Landscapes in Random Systems, Driven Interfaces and Wetting" in the 18th General Conference of the Condensed Matter Division of the European Physical Society "EPS-CMD 18", March 13-17th 2000, Montreux, Switzerland.

"Energy Landscapes in Random Systems, Driven Interfaces and Wetting" in the Nordita Workshop on Nonequilibrim Physics, September 23rd-25th 1999, Copenhagen, Denmark.

"A Surprise in the 2D Random Field Ising Model at $T = 0$: A Percolation Phase" in the 22nd International Conference on Low Temperature Physics, "LT22", August 4-11th 1999, Espoo and Helsinki, Finland.

"Percolation in the 2d Random Field Ising model" in the Middle European Cooperation in Statistical Physics, "MECO 24", March 8-10th 1999, Lutherstadt Wittenberg, Germany.

in the 1998 Conference on Computational Physics, September 2nd-5th 1998, Granada, Spain.

in the XXth IUPAP International Conference on Statistical Physics, STATPHYS20, July 20-25th 1998, Paris, France.

in the Satellite Meeting to STATPHYS 20: "Applications of Field Theory to Statistical Physics: Soft Condensed Matter, Non-Equilibrium and Boundary Critical Phenomena", July 15-18th 1998, Bonn, Germany.

in the 32nd Annual Conference of the Finnish Physical Society, March 19th-21st 1998, Tampere, Finland.

in the International Summer School on Fundamental Problems in Statistical Mechanics IX, August 15-28th 1997, Altenberg, Germany.

in the International Workshop of Structurally Disordered Systems, February 14-16th 1997, Jyväskylä, Finland.

in the 29th Annual Conference of the Finnish Physical Society, March 16-18th 1995, Jyväskylä, Finland.

Summer schools, visits for research, etc.:

Visit for research at the University of California, Santa Cruz, USA, March 16-30th, 2001.

Visit for research at the Michigan State University, USA 8.-17.8.1996, 19.-23.5., 27.9.-9.10.1997, 12.8.-10.9.1999, 27.3.-25.4.2000 (total three months).

The "Methods Meet: Physics and Topical Issues of Society" Symposium, November 4-5th 1999, NORDITA, Denmark. Participation in a panel discussion.

The 8th International Summer School on Classical and Quantum Aspects of Disorder, August 3-6th 1998, Jyväskylä, Finland.

Visit for research at NORDITA, Denmark 24.2.-3.3., 21.-28.4., 3.12.-8.12.1997, 31.3.-3.4.1998.

Graduate Course on the Physics of Random Systems, lectured by Professor Amnon Aharony and Professor Ora Entin-Wohlman, February 9-27th, April 13-17th, and June 15-20th 1998, University of Oslo, Norway.

Visit for research in parallel computing in physics, EU funded TMR/TRACS-programme in Edinburgh Parallel Computing Centre, March 3rd - May 17th 1996 and March 3rd - April 21st 1997 at the Edinburgh University, UK (total five months).

The 5th International Summer School on Many-Body Physics, August 14-25th 1995, Jyväskylä, Finland.

Teaching experience:

Teaching assistant in Physics I and Physics II for 'Chemical Technology', 'Forest Products Technology', and Open University students, four semesters.

Teaching assistant in Physics I and Physics II for 'Materials Science and Rock Engineering' and 'Computer Science and Engineering' students, five semesters.

Teaching assistant in Physics I and Physics II for English speaking students, four semesters.

Assistance in preparing the lecture material for the courses Physics I and Physics II for English speaking students.

Supervised five summer students, of which three wrote a special assignment.